

## RVS-1: REGENERABLE DESULFURIZATION SORBENT

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The National Energy Technology Laboratory (NETL) has been involved in the development of regenerable desulfurization sorbents since the mid-1980s. This effort has led to the RVS-1 sorbent, aptly named after its developer Dr. Ranjani V. Siriwardane. Development of the RVS-1 sorbent by Dr. Siriwardane and commercial development efforts by her colleague, Dan Cicero has resulted in both being awarded an R&D 100 Award for the year 2000. Recently, NETL negotiated a licensing agreement with Sud Chemie for production and sale of the fixed bed/moving bed sorbent.

Though RVS-1, a regenerable desulfurization sorbent will probably never be a household word, the cheap, coal-fired electricity made clean by RVS-1 may soon be powering our homes.

The sorbent boasts a high sulfur capacity unaffected by regeneration, a high crush strength, which improves during multi cycle testing, and a high attrition resistance. The fixed bed/moving bed version of RVS-1 has been shown to supersede the requirements of warm and hot gas cleanup conditions (500 to 1100 °F).



### Test Results

RVS-1 has successfully completed a 50-cycle sorbent test at NETL and a 240-hour pilot plant testing at General Electric.

Additionally, the sorbent has successfully completed a 25-cycle test at Research Triangle Institute (RTI) at conditions representative of the Tampa Electric Clean Coal (TECO) demonstration project. Sulfur was reduced to the parts-per-million (ppm) range.



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## PARTICIPANTS

**General Electric  
Corporate Research  
and Development**  
Schenectady, New York

**Research Triangle  
Institute**  
Research Triangle Park,  
North Carolina

**McDermott Technology, Inc.**  
Alliance, Ohio

**M.W. Kellogg Company**  
Houston, Texas

## Test Results

In others tests, McDermott Technology Incorporated (MTI) used RVS-1 for sulfur removal from diesel fuel during a 2.5 kW fuel cell project. As a result, RVS-1 was also selected for a 500 kW demonstration project at MTI.

A modified version of RVS-1 lowered sulfur levels to the parts-per-billion (ppb) level during a 20-cycle test at RTI.

## New Uses

A version of RVS-1 is currently being developed for use in a fluid/transport bed. Rather than pellet-size particles typically used in fixed/moving beds, the fluid/transport bed version of RVS-1 will consist of particles 80 to 120 microns in size. To date, small-scale preparation of spray dried sorbent has met the performance criteria such as sulfur capacity of greater than 5 wt percent, and Davidson attrition index of less than 10 wt percent with a density of greater than 50 lb/ft<sup>3</sup>. Research efforts will continue to improve the attrition resistance of the sorbent for large-scale preparations. Once the attrition criteria is met the sorbent will undergo fluid bed tests at RTI, additional attrition tests at MW Kellogg and small scale transport reactor tests at MW Kellogg.



*The Regenerable Desulfurization Sorbent RVS-1*